

Goal 2 Acquisition Human Factors Plan FY02-06



**Office of the Chief Scientist for Human Factors
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Goal 2 Acquisition Human Factors Plan

(FY02-06)

I. **Purpose:** This program plan establishes an outline for research and technical support of acquisition systems/programs, domains, and other acquisition activities and applications to support ARA Goal 2 (Human Factors). It is to be a “living” document that reflects updates to the program and monitors the achievement of program objectives. Objectives of the plan include:

- Assist in achieving ARA Goal 2 objectives
- Provide a mechanism to maintain and document changes and progress in the program
- Execute a concept that integrates process improvement, acquisition assessments, HF acquisition training/ICIP, and other initiatives and developments
- Plan the appropriate expenditure of available funds supporting this effort

II. **Background:** Under the Acquisition Management System, the Integrated Requirements Teams (IRTs), Investment Analysis Teams (IATs), and Integrated Product Teams (IPTs) are empowered, cross-functional teams that have the responsibility for participating in the delivery of a product or service that meets the needs of their customer. The integration of human factors into these teams and the application of human factors to acquisition programs helps ensure that the system design is human-centered, meets program goals and objectives, reduces risk, lowers life cycle costs, and achieves a higher probability of program success. Human factors research and support to IRT/IAT/IPTs ensures the most effective use of human capabilities and minimizes the effects of human limitations and errors on the overall performance of the system. The degree of human factors support required varies by program and considers the complexity of the system, the acquisition strategy, the phase of development, interaction and integration with other systems, and the level and type of human involvement.

III. **Scope:** By 2005, in accordance with ARA goals, all systems and domains are to be adequately supported by human factors activities and professionals. Issues that may be addressed include those listed at Attachment 4. ARA Goal 2 specifically addresses human factors support for acquisition (research and engineering). Attachment 1 provides a more detailed list of tasks and activities supporting the ARA Goal 2 strategies.

IV. **Concept, Strategy, Approach, Roles and Responsibilities, Controls):**

A. **Concept:** The concept of coordinated management and decentralized execution of a human factors program consists of two primary elements: 1) a centralized element of a small number of resources to help direct, manage, coordinate, support, and integrate disparate research and engineering acquisition human factors activities, and 2) a decentralized element collocated with the domains and environments to coordinate and integrate human factors research and engineering activities within and across the domains/environments. The human factors “decentralized” role is executed by human factors coordinators (HFC) collocated in appropriate quantities within the business lines and IRT/IAT/IPTs to ensure that adequate human factors support is rendered. In acquisitions, the HFC’s major responsibilities include participating in the development of integrated requirements, supporting investment analysis of alternatives, assisting in SIR preparation or market surveys, serving on source selection panels, preparing human performance test and evaluation criteria, preparing data collection and analysis plans,

participating in post contract award activities (attending CDRs, PDRs), etc. This plan accommodates considerations of critical mass, the exchange of discipline unique information, the sharing of lessons learned, the efficient use of resources, and the relation between research and applications.

B. Strategy: Achieving human factors integration (and Goal 2 objectives) involves two primary strategies. These are:

Strategy 2.1 (Research): Conduct human factors research to provide the knowledge base and foundation for the integration of human factors into the acquisition of FAA systems and applications.

Strategy 2.2 (Acquisition Engineering): Apply human factors policies, processes, and best practices through engineering activities and assessments to ensure human factors issues are integrated in FAA acquisition and applications.

The first strategy (Research) is to be achieved through research projects completed and accepted by the ARA/ATS sponsors as specified in the Annual ARA Acquisition Human Factors Plan. The second strategy (Acquisition Engineering) is to be accomplished by integrating human factors in and across systems ensuring that they satisfy (or have initiated actions to satisfy) human factors policies, processes, and best practices. Supporting the Acquisition Engineering strategy are two elements:

Element 2.2.1 (Policy, Processes, and Best Practices):

- Monitor FAA acquisition policy/guidance, processes, and best practices and propose revisions as necessary.
- Conduct a review of technical tools and acquire the necessary tools, capabilities, and techniques.
- Propose and conduct human factors training.

Element 2.2.2 (Risk Assessment and Mitigation Activities): Conduct an annual assessment across systems and applications to determine the percent of systems that meet or exceed HF standards; to assess and establish the human factors infrastructure requirements; to ensure that human factors issues/potential impacts and risks continue to be identified and documented and resolved; to ensure that resource requirements and implementation plans are established to resolve outstanding issues; and to ensure activities are conducted to apply human factors engineering principles.

One of the most critical sub-elements of these strategies is to ensure that the appropriate level of human factors expertise is available. A staffing plan has been prepared to manage and document this important objective (Attachment 5). To assist in the acquisition of this expertise and to facilitate the transfer of developing technologies, NASA and FAA will cooperate in a Personnel Succession Plan. This plan provides a method to transition the intellectual capital from NASA to the FAA at the same time the technology development activities transition. Such a transition fosters a succession of acquired expertise to the developing technology as well as providing a succession of specialized, new human factors related expertise within the FAA. This Personnel Succession Plan approach provides for the effective and efficient exchange of acquired expertise, and supports Goal 2 (Human Factors) of FAA Associate Administrator for Research and Development for the integration of human factors in all FAA aviation systems and applications.

Under this concept, personnel selected under the auspices of the Implementation Plan would be eligible for consideration to transfer to a similar engineering and development position within the FAA's infrastructure. This Personnel Succession Plan is expected to: a) assist in sustaining critical knowledge (both specialized in the developing technology and generally in human factors research and acquisition); b) support the achievement of Goal 2 objectives related to the integration of human factors in FAA applications; c) enhance the ability to meet objectives related to FAA infrastructure development; and d) avoid the loss of critical resources when technology transfers occur.

C. Approach: The approach to meeting Goal 2 objectives entails using this ARA Goal 2 Acquisition Human Factors Plan as an annually updated refinement of broader, more diverse plans such as the National Plan for Aviation Human Factors or the ATS baseline research plan. This ARA Goal 2 Acquisition Human Factors Plan describes an iterative interaction within and among acquisitions and applications, leading to an increasingly detailed and tailored exchange of human factors information. The exchange will reflect information relative to human factors risk identification, prioritization, and mitigation; program/product human factors assessments and issue identification; general and technical human factors training; process improvement (e.g., iCMM) and other HF processes, requirements, and improvements; and human factors research requirements, planning, and execution. An elaboration of the means to execute the human factors risk assessment and mitigation activities (Goal 2 Element 2.2.2) is at Attachment 2. An elaboration of the means to execute the human factors training concept (within Goal 2, Element 2.2.1) is at Attachment 3.

D. Roles and Responsibilities:

1. Team Role: The IRT/IAT/IPT is responsible for developing concepts, requirements, prototypes, and functions to be incorporated into operational systems. An integral part of this responsibility involves ensuring that human factors is fully integrated and consistently applied within the domain so that future systems maximize human-system productivity and performance.

2. Office of the Chief Scientific and Technical Advisor for Human Factors (AAR-100) Role: The Office of the Chief Scientific and Technical Advisor for Human Factors (AAR- 100) is responsible for ensuring HF considerations are recognized and adequately addressed by all FAA organizations. In promoting HF throughout the FAA, AAR-100 coordinates with each IRT/IAT/IPT to ensure that human factors is fully integrated into all FAA systems engineering, development, and deployment efforts. As such, AAR-100 assists the team in defining and implementing a HF program that is consistent with the HF principles being applied FAA-wide.

3. HFE Coordinator Roles in System Acquisition Management:

a. Human Factors Coordinators play a primary role in the following system issues and interfaces:

- Equipment design issues: hardware and software
- Safety and health interfaces: protection and prevention
- Environmental interfaces: workspace; physical and psychological surroundings
- Organizational interfaces: job design, management structure, and organizational structure
- Functional interfaces: allocation of functions and tasks between the human and automation
- Information interfaces: media, controls, displays, and content
- Operational interfaces: training, procedures, and performance aiding
- Cooperational interfaces: communications and team relationships
- Cognitive interfaces: situational awareness, mental workload, and decision making

b. Human Factors Coordinators perform, direct, or assist in conducting the following activities:

- Mission analysis and requirements determination (human impacts, constraints)
- Human-system interface considerations in market surveys/investigations/trade studies
- Generation and update of human factors engineering plans
- HFE input to solicitation package preparation
- Identification and analysis of critical tasks performed by operators and maintainers
- Generation, refinement, and analysis of operational scenarios, human-system modeling, and human in the loop simulations
- Development, demonstration, and evaluation of Human Computer Interface design requirements, prototypes, design, and development efforts
- Review/analysis of Human Engineering documentation
- Coordination of human factors engineering working group activities
- Conduct of task performance analyses and coordination with training and logistics
- Conduct and coordination of Safety and Health Hazard Analyses
- HFE concepts, analyses, and assessments of ECPs, and of design at PDR, CDR
- HFE input to T&E plans, measures, criteria, and data collection efforts

E. **Controls:** Human factors progress and status reporting consists of the following:

- ARA performance plan reporting (including a quarterly rating of green, yellow/amber, red, or completed on the status of each Goal 2 task/activity listed at Attachment 1 during each fiscal year).
- Periodic and regular support activities and assessments on acquisition programs and applications (see Attachment 2), including continuous application of human factors engineering principles; an annual assessment of 100% of systems; periodic reporting during Acquisition Reviews by the line of business; and a summary of the status of human factors in selected applications.
- Overall program assessment of the institutionalization of human factors for acquisition support will be conducted (if only, informally and subjectively) using the major functions and attributes below.

FUNCTIONS	ATTRIBUTES
Direct acquisition support	<ul style="list-style-type: none">- Explicit- Systematic- Timely- Value-added- Efficient- Amount & quality of support
Infrastructure development	<ul style="list-style-type: none">- Number of federal and contractor HF support personnel- Experience of Support Personnel- Organization, management, and coordination of support personnel
Policy development	<ul style="list-style-type: none">- Comprehensive- Effective
Process implementation	<ul style="list-style-type: none">- Comprehensive- Effective
Training	<ul style="list-style-type: none">- Comprehensive- Effective

V. Conclusions. The implementation of ARA Goal 2 objectives entails the coordinated conduct of human factors research and acquisition engineering and supporting activities and assessments. This plan requires a direct and continuous exchange of information among agency human factors specialists and other members of program offices. The approach outlined in this plan provides a means to accomplish the exchange of critical information for human factors planning and execution in system acquisitions.

Attachment 1

FY2002 Goal 2 (Human Factors) Implementation Plan & Tracking

Human Factors Research and Acquisition Engineering: The following table provides a summary of the detailed milestones (including the critical tasks as identified in strategic planning documents) for FY02-06 implementation and tracking of Goal 2 activities. Status reporting is to be provided for each quarter within the current FY by indicating green, yellow, red, or completed:

- Green (G): Indications are that activity is on track to be completed as planned.
- Yellow (Y): Indications are that there are minor risks to the activity being completed as planned.
- Red (R): Indications are that there are major risks to the activity being completed as planned.
- Completed (C): Task/activity's objectives have been met on indicated date.

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Due Date
2.1	Strategy 2.1: Human Factors Research.		83% (10 of 12)				
2.1.1	Element 2.1.1: NAS Transition and Integration Requirements Research: Conduct human factors research and studies to increase human factors considerations and mitigate problems in the acquisition, design, operation, and maintenance of air traffic control automation systems.						
2.1.1.1	* Identify for ATP and the IPTs computer-human interface (CHI) issues associated with integration of pre-planned product improvements and other enhanced capabilities into the TRACON NAS baseline platform.	Complete study analysis. Volpe/AAR-100	G	G	G		09/02
2.1.1.2	Complete the update to targeted chapters of the Human Factors Design Guide (HFDG) for distribution to IPT and research communities.	Complete integration of updated chapters. ACB-220	G	G	G		09/02

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Due Date
2.1.1.3	Provide ATP with a human factors analysis of the multi-sector planning (MSP) position concept based on the WJHTC controller-in-the-loop simulation including position information requirements for flight data and human performance findings.	Complete report for MSP (SABET). ACB-220/AAR-100	G	G	G		09/02
2.1.1.4	Provide AOZ human factors findings from an initial engineering assessment of interoperability involving CPDLC, URET CCLD, and TMA.	Complete report. ACB-220/AAR-100	G	C 3/02	-	-	06/02
2.1.1.5	Provide ATT human factors recommendations for ATM/TFM on human factors issues and collaborative decision-making improvements.	Complete report. AAM-500/Ohio State University/AAR-100	G	G	G		09/02
2.1.1.6	Provide AOP findings and recommendations addressing compatibility of alerts and alarms across centralized monitor and control systems.	Coordinate site visits. ACB-220/AAR-100	G	G	C 6/02	-	09/02
2.1.1.7	Provide AOP with findings and recommendations from an assessment of standardization issues involving differences in command structures across COTS applications for monitor and control.	Coordinate site visits. ACB-220/AAR-100	G	G	G		09/02
2.1.1.8	Provide ATS and AHR with recommendations for using applicant biographical information in a centralized applicant process.	Complete study analysis. AAM-500/AAR-100	G	G	G		09/02
2.1.1.9	Deliver to ATX, AFZ, and AHR the Statistical Retirements and Attritions Model (SCRAM) for desktop (Office 97®) application.	Demonstrate initial version of software tool. AAM-500/AAR-100	G	G	G		09/02
2.1.2	Element 2.1.2: Human Error Research: Conduct research to develop effective methods for the assessment and amelioration of causal factors underlying operational errors/deviations, human error, and performance degradation.						

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Due Date
2.1.2.1	* Provide AAT an improved taxonomy of causal factors of operational errors through completion of the beta test of the FAA/EUROCONTROL harmonized model known as JANUS. Leverage the FAA-EUROCONTROL Action Plan 12 (AP12) on the Management and Reduction of Human Error in Air Traffic Management that is developing a harmonized model of causal factors of operational errors.	Complete beta test phase. AAM-500/AAR-100	G	G	G		09/02
2.1.2.2	Provide ARI a prototype interactive tutorial for tower controllers on runway safety.	Demonstrate initial version of prototype. Volpe/AAR-100	G	G	G		09/02
2.1.2.3	Complete for ATP and ATX a research study of controller performance associated with stress and workload.	Complete initial version of study plan. AAM-500/AAR-100	G	G	G		09/02
2.2	Strategy 2.2: Human Factors Acquisition Engineering. 85% (22 of 26)						
2.2.1	Element 2.2.1: Policy, Processes, Technical Tools, and Training: Monitor, review, and propose revisions to FAA acquisition policy/guidance, processes, tools, and training as outlined in an annually updated 5-year plan.						
2.2.1.1	Harmonize alternative templates for Human Factors Program Plan documentation. • Three alternatives identified	Publish a harmonized format. AAR-100	G	G	G		4/2002
2.2.1.2	Prepare guidelines for Human Integration Sections of AMS documents (e.g., FAST, HF Job Aid). • Awaiting LMP implementation	Submission of guidance on acquisition documentation. AAR-100	G	G	Y		6/2002
2.2.1.3	Prepare examples for Human Integration Sections of AMS documents (e.g., FAST, HF Job Aid). • Awaiting LMP implementation	Submission of examples on acquisition documentation. AAR-100	G	G	G		3/2003

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Due Date
2.2.1.4	Support the development of a System Engineering Manual with Human Factors input. <ul style="list-style-type: none"> Section 4.4 Section 4.8 	Submit initial SEM documentation for HF. AAR-100/ASD-100	G	C 1/02	-	-	2/2002
2.2.1.5	Support Process Improvement (Goal 7) through the review of iCMM Evolution products for subsequent Process Area document revision (e.g., PA03, 05, 07, 11, 12, 13, 15, 16, 22) <ul style="list-style-type: none"> In review process Partially Completed (PA03, 04, 11, 12, 13, 15) 	Review and comment on selected PAs. AAR/AIO	G	Y	G		1/2002
2.2.1.6	Support the publishing of a report on human system integration (HSI).	HSI report is published. AAR-100	G	G	G		12/2002
2.2.1.7	Publish and distribute a cost-estimating tool for human factors support requirements in acquisitions.	HF cost estimating tool is created and distributed. AAR-100	G	C 3/02	-	-	3/2002
2.2.1.8	Identify needs for baseline measures for critical areas (such as anthropometry, noise).	Conduct a review to identify needs for baseline measures. AAR-100	G	G	G		7/2002
2.2.1.9	Incorporate Uniform Federal Accessibility Standards within FAA HF guidelines.	Document UFAS guidelines. AAR-100	G	G	G		6/2003
2.2.1.10	Convert the HFDG to an FAA standard	Publish the HFDG as an FAA standard. AAR-100	G	G	G		9/2002
2.2.1.11	Include a link from the "linking reference document" to HF Acq Rev Guidance in FAST.	Revise the document on the HF Home Page. AAR-100	C 9/01	-	-	-	10/2001
2.2.1.12	Complete initial modules of Human Factors Awareness training for web-based application <ol style="list-style-type: none"> Introduction (90%) HF Model (90%) Usability (85%) 	Completion of three modules. AAR-100/ABZ	G	G	G		9/2002

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Due Date
	4. Visual Display (75%) 5. Non-visual Display (75%) 6. Cognition (75%)						
2.2.1.13	Conduct Human Factors awareness, technical and tailored training in accordance with training objectives.	Conduct of technical training session. AAR-100/ABZ	G	G	G		9/2002
2.2.1.14	Organize Human Factors training as an element of Systems Engineering training	Effect reorganization AAR/ABZ/ASD	G	C 3/02	-	-	2/2002
2.2.1.15	Update the FAA Human Factors Job Aid (e.g., new DID list, guidance on developing requirements)	Updated FAA HF Job Aid AAR-100	G	G	G		6/2003
2.2.1.16	Revise/Update the FAA Order 9550.8	Revise/republished FAA Order 9550.8 AAR-100	G	G	G		TBD
2.2.1.17	Revise FAA-STD-025 with human-system interface requirements.	Include HSI requirements in FAA-STD-025E AAR-100	G	G	G		TBD
2.2.1.18	Include Human Factors as an item in the JRC briefing elements for JRC Guidance	“Human factors” listed as an element for JRC AAR-100/ACM	New Rqmt	C 1/02	-	-	3/2002
2.2.1.19	Explore alternatives to centralized posting/access of HF inputs to AMS documentation	Report back to HF Acq Team AAR-100	New Rqmt	G	G		TBD
2.2.1.20	Review/revise IA policy/guidance <ul style="list-style-type: none"> • Revise guidance for risk assessments • Review/revise IA and SI policy changes • Review IA process guidance • IA Workshop presentation slides • Recommendations for Risk Metrics Standard • Request review of ASD “standardization” products (13) 	Submit input to ASD-400 AAR-100/ASD-400		New Rqmt C 3/02	-	-	3/2002
2.2.1.21	Expand the human factors portion of the AMS work breakdown structure	Prepare, staff, put on Internet, adopt in FAST		New Rqmt	G		TBD

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Due Date
		AAR-100/ASD-400					
2.2.1.22	Provide definition and guidance on “HF Assessments in Investment Analysis”	Prepare and publish guidance AAR-100	New Rqmt	C 3/02	-	-	6/2002
2.2.1.23	Review of ASD “standardization” products (13) for HF prespective	Review “standardization” products and comment AAR-100/ASD-400			New Rqmt		TBD
2.2.2	Element 2.2.2: Risk Assessments and Mitigation Activities: Conduct risk assessments and mitigation activities across systems and applications to: determine the percent of systems that meet HF best practices; assess and establish the human factors infrastructure requirements; ensure that human factors issues, potential impacts and risks continue to be identified, documented and resolved; ensure that resource requirements and risk mitigation plans are established to resolve outstanding issues; and ensure activities are conducted to apply human factors engineering principles.						
2.2.2.1	Review and revise as necessary the process for conducting, summarizing, and reporting the FY assessments (especially, who serves as raters, more effective use of results).	Conduct a lessons learned session and revise the process accordingly. AAR-100	C 11/01	-	-	-	11/2001
2.2.2.2	Update 5-year plan with results of FY01 support activities and assessments (e.g., policy, process, training, support activities).	Updated 5-year plan. AAR-100	C 11/01	-	-	-	1/2002
2.2.2.3	*Review FY01 assessment results to identify the top systems for human factors risks (i.e., AMASS, WAAS, NEXCOM; OASIS-AFSS, OASIS-DUATS, ACE-IDS; ERAM RD, LAAS FRD) to be targeted for improvements, and update annual risk assessments.	Percentage of systems assessed and targeted systems improved to satisfy human factors integration requirements.	G	G	G		Systems assessed by 6/2002 and target met by 9/2002

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1 st Qtr	2 nd Qtr	3 rd Qtr	4 th Qtr	Due Date
		AAR-100/AUA/AND					
2.2.2.4	*Acquire and assign human factors personnel to meet annual staffing goals for targeted areas (i.e. FY02: ATB, AND-400; FY03: AUA-700; AND-700) <ul style="list-style-type: none"> • AND-400 position interviews were conducted 6/02 • ATB hiring freeze 	Two personnel are acquired and assigned AAR/AND/ATB/AUA/AAR-100	G	G	Y		9/2002
2.2.2.5	Devise an approach and initiate a systematic review of program requirements and documentation. <ul style="list-style-type: none"> • Coordination with ARQ • Briefing to ARQ reps • Inclusion in SE&A Issues • ERAM RD • ATOPS RD • LAAS FRD • LRR, PS3, NACO HF review • NEXGEN FRD • DC BUS System (OCD/T Eval Criteria/Weights) • SASO FRD 	Result from and number of requirements documents reviewed and revised. AAR-100/ARQ	G	G	C 6/02	-	9/2002 and each FY
2.2.2.6	Support IATs tasks and engineering activities to ensure that resource and implementation plans address HF risks. <ul style="list-style-type: none"> • Coordination with ASD-400 • ASCM Risk Assessment • ASCM ASP • SASO IAP, Risk Assessment • ASR-9/Mode-S/WSP Risk Assessment • 24v DC BUS Tech Eval Plan • ERAM Risk Assessment • NEXGEN IAP 	Percent of IATs for which human factors tasks and activities are conducted. AAR-100/ASD-400	G	G	C 6/02	-	9/2002 and each FY
2.2.2.7	Conduct feedback session on the conduct of support activities and assessments by providing the status of the FAA's human factors program (e.g., AAR report to ARA on ARS/ATS/ASD feedback on Strategy 2.1 and	Feedback is received and reported on a quarterly basis. AAR-	G	G	C 5/02	-	9/2002 and each FY

ID	Output/Activity (*Critical Task)	Completion Indicator Who	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Due Date
	AUA/AND feedback on Strategy 2.2).	100/AUA/AND/ARS					
2.2.2.8	Conduct an acquisition working group forum for exchange & coordination of HF acquisition considerations <ul style="list-style-type: none"> • IAIP T IM: 02/02 • HFA Team meetings: 9/01; 1/02; 4/02; 5/02 • HFAWG meeting: 4/8/02; 7/11/02 	Semi-annual acquisition working group forum is conducted. AAR-100	G	G	C 4/02	-	9/2002 and each FY
2.2.2.9	Initiate coordination with T&E activities to strengthen HF support in testing (e.g. HF test personnel, use of test results, HF test strategies). <ul style="list-style-type: none"> • Task devised/discussed with AAR-100 POC • POC at WJH TC? 	Initial coordination is conducted to devise strategy. AAR-100/ACT	G	Y	G		2/2002 (9/2002)
2.2.2.10	Integrate considerations of Goal 5 (NAS Modernization) w/ HF system assessments.	Goal 5 modernization list is coordinated with key personnel and Goal 2 System List. AAR-100/ASD-100	G	G	C 6/02	-	9/2002 and each FY
2.2.2.11	Facilitate coordination of Program Directives (e.g., Tech Center, Volpe) <ul style="list-style-type: none"> • Use of research data base proposed as coordination mechanism 	Update PD list on KMS site. AAR-100/ACB-220	G	Y	G		1/2002 and twice each FY
2.2.2.12	Conduct an annual staffing requirements review for overall human factors support.	Updated annual staffing plan. AAR-100/HFAWG	C 11/01	-	-	-	1/2002 and each FY
2.2.2.13	Establish concepts for conducting HF field surveys of deployed systems. <ul style="list-style-type: none"> • Field survey of tower specifications • Coordination with ATS? • Possible site visits w/ AF/AT reps? • Broaden tower visit issues with expanded tower questionnaire? • Organizational obstacles (e.g., ARTS Color Displays)? 	Establish pilot survey concepts and mechanisms. AAR-100, AND, AUA	G	Y	G		3/2002

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2.2.2.14	Initiate a survey of HF POCs for status of HF Institutionalization. <ul style="list-style-type: none"> Survey drafted Survey distributed for comment Distribution planned for HFAWG meeting 	Conduct an initial survey. AAR-100/HFAWG	G	C 3/02	-	-	1/2002
2.2.2.15	Revise the format of the HF assessment (working papers)	Adopt new assessment format AAR-100	C 11/01	-	-	-	12/2001
2.2.2.16	Emphasize in the assessments the resource adequacy (staffing and funding) and HF issues	Revised assessment format and follow-up AAR-100	New Rqmt	G	C 6/02		6/2002
2.2.2.17	Advise the acquisition leadership about the requirement to report on human factors issues during the Acquisition Review <ul style="list-style-type: none"> Concepts discussed at HFATeam meetings AR guidance linked to FAST and CM intranet Pre-AR HF review proposed (see 2.2.2.28) Format distributed @ HFAWG Inform IMT? 	IMT and IPTs advised AAR-100	New Rqmt	G	G		3/2002
2.2.2.18	More formally and more frequently rate or update the major HF issues within the directorates (i.e., issues across systems within AUA/ATB, AND, and AOZ) <ul style="list-style-type: none"> Revised HF Newsletter format More frequent HFAWG meetings (qtrly) More frequent HFACq Team meetings (monthly) Frequent discussions in ARA mgt team meetings 	Conduct periodic info sessions AAR-100	New Rqmt	G	C 6/02		7/2002
2.2.2.19	Create a template for the Acquisition Review “HF Issues” reporting and distribute it to IPTs <ul style="list-style-type: none"> Draft template created Distributed to AUA/AND HF reps Discussions to continue 	Create and distribute AR HF Issue template AAR-100	New Rqmt	C 3/02	-	-	3/2002
2.2.2.20	Place more emphasis on requirements development <ul style="list-style-type: none"> systematically review requirements 	Conduct and follow-up on meeting with ARQ	New Rqmt	G	C 6/02	-	6/2002

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	<ul style="list-style-type: none"> seek and coordinate w/ system/environment expertise during requirements development provide requirements development guidance meet with ARQ on ways to strengthen HF requirements development provide results to ARQ 	ARQ/ AAR-100					
2.2.2.21	Include “green” systems in Top 3 and specify the criteria for remaining “green”	Revise top 3 to address real priorities AAR-100/AND/AUA/ATB	New Rqmt	C 1/02	-	-	1/2002
2.2.2.22	Conduct error risk review for ACD (esp. at NY TRACON)	Prepare paper summarizing results	New Rqmt	G	G		7/2002
2.2.2.23	Place emphasis on key HF issues (e.g., cognitive requirements, task performance, error rates, time to perform) in documentation and guidance <ul style="list-style-type: none"> Elements added to ASD Risk Assessment Guide Revise Job Aid? Revise RD template? 	Changes in documentation (e.g., AMS templates, Job Aid) AAR-100	New Rqmt	G	G		TBD
2.2.2.24	Complete (ASDE-X) Surface Safety Framework Study	Distribute White Paper AAR-100/ASD-2/AND-300	Start in FY01	C 1/02	-	-	3/2002
2.2.2.25	Support Security Equipment IPT Computer Based Training vendor selection	3 commercial vendor solicitation packages evaluated AAR-100/AAR-500	New Rqmt	C 1/02	-	-	3/2002
2.2.2.26	Initiate activities to establish a “human factors specification” for the Tower environment	Tower Spec study is initiated AAR-100/ATB	New Rqmt	G	C 5/02	-	9/2002
2.2.2.27	Conduct an annual review of the following areas for improvement: <ol style="list-style-type: none"> Establishing system human performance requirements Collecting system human performance data Establishing human factors best practices 	TBD AAR-100		New Rqmt	G		TBD

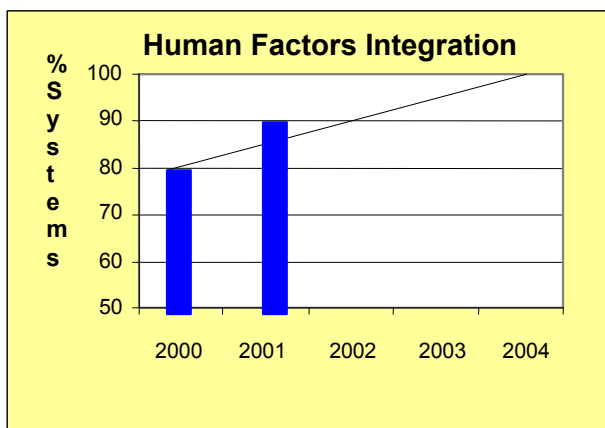
ID	Output/Activity (*Critical Task)	Completion Indicator Who	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Due Date
	4) Standardizing system CHI 5) Establishing system human performance baselines 6) Testing human-system performance 7) Prototyping human-system performance 8) Designing systems for training/usability 9) System Documentation of human factors						
2.2.2.28	Initiate pre-acquisition review briefings between IPT HF representative and Chief Scientist for HF	Concept developed and distributed, schedule initiated AAR-100/IPTs		New Rqmt	G		TBD
2.2.2.29	Increase the availability of controller task information (e.g., task analyses, critical task analyses, task performance data) via hardcopy, web-based info, or other method	Publish and distribute relevant information AAR-100		New Rqmt	G		TBD
2.2.2.30	Complete Tower Specification Study	Publish and distribute results AAR-100/ATB			New Rqmt		TBD

Attachment 2

Implementation of ARA Goal 2 Human Factors Risk Assessment and Mitigation Activities

Conducting this portion of the ARA Goal 2 involves the integration of human engineering support activities and assessments (Element 2.2.2) which include detailed human factors engineering, human factors risk assessments, mitigation planning for and resolution of identified and prioritized human factors risks, and other applications of general human factors and process improvement (e.g., iCMM) principles and processes. The approach for these activities consists of periodic and regular support activities and assessments on acquisition proposals, programs, and applications, including:

- Continuous application of human factors engineering principles using best practices and procedures
- Periodic reporting during Acquisition Reviews by the line of business on program risks and mitigation activities
- A summary (annually or as required) of the status of human factors in and across acquisition systems and applications (such as indicated in the chart below).



I. Continuous application of human factors engineering principles using best practices and procedures. Program/project support activities are to be conducted by employing human factors best practices and guidance (e.g., HF process improvement concepts, iCMM HFE Addendum, FAA Human Factors Job Aid), helping to determine better ways to integrate human factors in FAA acquisitions, and assisting in that integration on program activities. These activities (as they are conducted in conjunction with tailored training targeted to the specific needs of the acquisition program) should be a collaborative activity among agency human factors specialists and IRT/IAT/IPT personnel. Areas to be address in the human factors activities include:

- HF program development and management
- Identification of HF risks and requirements
- Conduct of HF mitigation and integration
- Conduct of HF verification, validation, & evaluation
- HF process assessment and improvement

Human factors support activities may be conducted along three areas of activity (as outlined below): 1) Program Management, 2) Issue Identification and Exploration, and 3) Risk Mitigation Planning and Execution. These activities should be conducted throughout the lifecycle of the project, and emphasized

during the early acquisition phases of the program (i.e. during requirements development, investment analysis, and prior to program Acquisition Reviews during Solution Implementation). Table 2-1 (Human Factors Framework for Acquisition Proposals/Programs/Projects) provides a conceptual framework for the HF program.

A. Program Management: This activity consists of: a) an initial qualitative human factors risk assessment (high, medium, low) based on such factors as program cost and schedule, level of funds involved, complexity of human-system interface, criticality of system, senior management priorities, etc.; b) discussions among key IRT/IAT/IPT members as to the strategic approach, scope, role and responsibilities, and methodologies for integrating and conducting human factors activities in the program; c) identification of general human factors staffing, qualification, and training requirements; and d) the monitoring of the human factors program as well as the conduct of appropriate tailored human factors training.

B. Issue Identification and Issue Exploration: This consists of detailed and in-depth activities conducted with selected IRT/IAT/IPT members to identify: a) what human factors risks (issues) need to be addressed and when, b) what activities need to be conducted, and when, in order to address the risks/issues, c) what schedule and resources (plans) need to be allocated by whom to resolve the risks/issues, and d) appropriate tailored, specific human factors training requirements.

C. Risk Mitigation Planning and Execution: These activities consist of resolution of human factors risks/issues through the appropriate (and agreed upon) analyses, studies, research, or engineering design and development activities; the conduct of verification, validation, and evaluation activities to determine how well the resolutions achieve stated objectives; and the assessment and conduct of human factors process improvements.

Table 2-1: Human Factors Framework for Acquisition Proposals/Programs/Projects

Program Management	Issue Identification and Exploration	Risk Mitigation Planning and Execution		
Develop and Manage Human Factors Program <ul style="list-style-type: none"> • Mission Analysis & Requirements Development • Investment Analysis • Solution Implementation • In-Service Management 	Identify Human Factors Risks and Requirements <ul style="list-style-type: none"> • Mission Analysis & Requirements Development • Investment Analysis • Solution Implementation • In-Service Management 	Conduct Human Factors Mitigation and Integration Activities <ul style="list-style-type: none"> • Mission Analysis & Requirements Development • Investment Analysis • Solution Implementation • In-Service Management 	Conduct Human Factors Verification, Validation, and Evaluation <ul style="list-style-type: none"> • Mission Analysis & Requirements Development • Investment Analysis • Solution Implementation • In-Service Management 	Assess and Conduct Improvement of Human Factors Processes <ul style="list-style-type: none"> • Mission Analysis & Requirements Development • Investment Analysis • Solution Implementation • In-Service Management

II. Periodic reporting during Acquisition Reviews by the line of business on program risks and mitigation activities. Program/project teams and managers are to report on the status of human factors engineering during Acquisition Reviews to include human factors issues or risks related to the system acquisition and projected operations and maintenance, including activities being conducted or planned to

address or mitigate human factors risks/issues. Information reported should reflect any human factors system development and implementation plans and documentation prepared/approved.

III. A summary (annually or as required) of the needs for and status of human factors in and across 100% of acquisition systems and applications. An exchange between human factors and other acquisition personnel that helps to identify the needs for and status of human factors in each acquisition program serves three purposes. It assists in the identification of research requirements that may be conducted by the human factors research community. It provides program/project personnel information about what human factors resources (e.g., tools, training, people, funding, information) may be available or may be needed on the acquisition. And, it provides a “systemic” evaluation of the status of human factors across programs so to articulate the “threads” of human factors requirements and deficiencies to be addressed across the acquisition community. Collaboration among human factors practitioners and with program/project personnel on the needs for and status of human factors in and across acquisitions systems and applications consists of three elements:

A. An annual assessment of systems and applications for human factors resource requirements and prioritization. This assessment consists of a qualitative human factors risk assessment (high, medium, low) to prioritize human factors resource requirements. Because the assessment consists of a “snapshot” in time, results will depend upon the current status of the program/project and the schedule of events. The prioritization for human factors resources will be based on the following prioritization factors (not listed in order of importance):

1. Sponsor’s assessment of priority and user input
2. Visibility of the program
3. Importance to the NAS
4. Congressionally mandated programs
5. Complexity and level of the operator and/or maintainer interfaces
6. Program schedule
7. Acquisition strategy (COTS/NDI vs development)
8. Number of systems to be fielded
9. Dollar value of the program
10. Opportunity to influence design

B. Risk assessments in acquisition programs and applications. This assessment consists of a review and a “snapshot” of the human factors risks on all (IRT/IAT/IPT) programs. The results of the assessment are to provide information by or in conjunction with the IRT/IAT/IPT on the status of human factors in the program. The format of the assessment results may entail a narrative description of the risks and their severity as well as a report (red, amber, green) of the degree of human factors integration in the system or application. Coding of the assessments should conform to definitions and/or table below:

Levels of Risk:

Low:

- Consequences of poor HF aspects of design are low in terms of workload, task accomplishment, or error potential
- System complexity is low

Moderate:

- Consequences of poor HF aspects of design will be observable and measurable, but may be managed using compensations

- System complexity is moderate and has a moderate impact on user interaction in operational scenarios

High:

- Consequences of poor HF aspects of design may result in significant impact on user workload, task accomplishment, or error probability
- System complexity is high and has a major impact on user interaction in operational scenarios

Degree of Integration:

- **Green:** No significant human factors issues, concerns, or risks are associated with the program, or human factors issues, concerns, or risks have been identified and the program has appropriate plans and resources to address them adequately.
- **Amber:** Human factors issues, concerns, or risks have been identified and the program has incomplete and/or insufficient resources to address them, or potential human factors issues or concerns cannot be specified at this time (e.g., a more in-depth assessment is required).
- **Red:** Human factors issues, concerns, or risks have been identified and the program has major insufficiencies in plans or resources to address them.

Level of Human Factors Risk	High (or Sufficient) Level of Needed Resources, Plans, and Activities are in Place	Moderate (or Limited) Level of Needed Resources, Plans, and Activities are in Place	Low (or Negligible) Level of Needed Resources, Plans and Activities are in Place
Low	Green	Green	Green/Amber
Moderate	Green	Amber	Amber
High	Green	Amber/Red	Red

A framework for conducting the risk assessment and integrating it within process improvement concepts (i.e., iCMM) and human factors best practices taken from the FAA HF Job Aid is at Table 2-3. An assessment format to summarize system assessments might include:

- Program/project name and description
- Assessment “as of” date
- Narrative description of risks identified that are associated with:
 - HF Program Management
 - Identification of HF Risks and Requirements
 - Conduct of HF Mitigation and Integration
 - Conduct of HF Verification, Validation, & Evaluation
 - HF Process Improvement Practices, Lessons Learned, and Potential Enhancements
- Follow-up Activities

There are several criteria that may be used by which to conclude that a system is no longer a viable candidate for assessment. These criteria should be based upon the degree of human factors risk associated with the system and the opportunity to influence changes that will mitigate these risks. The criteria may include such parameters as:

- Success in completing OTE and IOTE
- Degree of successful deployment
- Degree of mitigation of issues/risks

C. Cross-cutting information flow on general human factors: This element of the assessment entails discussions and reporting on the status of human factors in general. It would include information that will assist in meeting ARA Goal 2 (Human Factors) objectives related to research and acquisition policy, processes, and best practices. Accordingly, the topics identified in Table 2-2 are of interest.

Table 2-2: ARA Goal 2 (Human Factors) Items of Interest.

STRATEGIC AREA	ITEMS OF INTEREST TO REPORT ON
Strategy 2.1: Research (Conduct HF research)	<ul style="list-style-type: none"> • Areas where human factors research and studies need to be conducted.
Strategy 2.2: Engineering (Institutionalize HF policy, processes, and best practices; support HF conventions, guidelines, and tools; conduct HF training; apply HF engineering principles)	<ul style="list-style-type: none"> • Areas where AMS policy/guidance/practices need to be changed to facilitate HF • Resources (number of qualified people and \$) needed vs. available for HF research and engineering activities • Tools, techniques, guidelines, data, etc. needed vs. available • Training required and training available • Human Factors risk areas and mitigation activities

Table 2-3: Framework for Human Factors Assessments

Assessment Area	ICMM Practices	FAA HF Job Aid Best Practices
FEEDBACK FOR ACQUISITION PROGRAM		
1. HF Program Management	2.1 Establish policy 2.2 Allocate adequate resources 2.3 Assign responsibility 2.4 Ensure training (Supported by iCMM HF Addendum Base Practice 24.01)	<ul style="list-style-type: none"> • Has a Human Factors Coordinator (HFC) been appointed? • Does the HFC have the appropriate human factors expertise and training? • Does the Human Factors Working Group (HFWG) membership represent all activities having significant human factors interest in the system? • Have HFWG Operating Procedures been established? • Is there an adequate procedure for all significant unresolved human factors issues to be brought to the attention of the program leadership? • Has a strategy for the Human Factors Program been developed that is consistent with the size, cost, and complexity of the system being acquired? • Are procedures established for revising the Human Factors Program when necessary?
2. Identification of HF Risks and Requirements	(Supported by iCMM HF Addendum Base Practices 24.01, 24.02, and 24.03)	<p><u>Concepts of Operation and Maintenance</u></p> <ul style="list-style-type: none"> • Have operation and maintenance concepts been adequately reviewed for human factors implications? • Has the operator and maintainer target population been adequately described? • Have the performance parameters of operator and maintainer tasks been adequately identified? <p><u>Formulating Human Factors in System Specifications</u></p> <ul style="list-style-type: none"> • Has the Human Factors Working Group had the opportunity to review and comment on the system specification? • Have human capabilities and limitations been considered in developing total system performance requirements? • Have human performance characteristics, physical characteristics, human engineering, safety, staffing and training requirements been specified? • Has human performance data collection and analysis been identified to verify compliance with human factors requirements? • Have measures of performance been identified to quantify human performance? • Have appropriate human factors documents been referenced in the specification? <p><u>Developing Human Factors Inputs for Acquisition Documentation</u></p> <ul style="list-style-type: none"> • Is the human performance element addressed in the mission analysis? • Does the Mission Need Statement input describe the human performance limitations associated with the capability shortfall or human performance enhancements associated with the new technology opportunity? • Is the human considered part of the total system in addressing the capability shortfalls or technological opportunities in the Mission Need Statement? • Does the Requirements Document input ensure that the human is considered as part of the total system when addressing the required capabilities and system performance? • Do operations and maintenance concepts in the Requirements Document adequately describe the role of the operators, maintainers, and support personnel?

		<ul style="list-style-type: none"> • Does the Investment Analysis Report input address the human factors lifecycle cost and benefits in terms of staffing, training, skills, safety, health, and human-system performance and interfaces for each alternative being considered? • Does the Investment Analysis Report baseline cost and schedule include considerations for suitable human factors design trade-offs, test and evaluation, and in-service operations and maintenance? • Does the Acquisition Program Baseline input identify the level of human performance and resources (e.g., personnel, training) necessary to meet the system performance requirements for the selected solution? • Does the Acquisition Strategy Paper human factors input employ a strategy to ensure the system is well designed and appropriate for the workforce that will operate and maintain it? • Does the Integrated Program Plan input identify the specific human factors tasks and activities that must be planned and executed to support the system design and development? • Are the human factors tasks and activities scheduled such that output products will be available in a timely manner? • Have constraints, limitations, and unique or specialized training requirements, staffing levels, or personnel skill requirements been addressed?
3. Conduct HF Mitigation & Integration	2.8 Manage configurations 2.14 Coordinate within the project 3.4 Coordinate with all affected groups (Supported by iCMM HF Addendum Base Practices 24.01 and 24.02)	<ul style="list-style-type: none"> • Have all appropriate human factors tasks, activities, and objectives been identified and resourced? • Has the human engineering effort been planned as an integrated portion of the overall system effort? • Has the human engineering effort been coordinated with other system engineering functions? • Has a functional analysis been conducted to determine information flow and processing required? • Have the system functions been properly allocated between the hardware/software and the human? • Does the design configuration conform to human engineering design criteria? • Have the results of task and workload analyses been used to influence system design? • Have required human performance analyses and studies been identified? • Does the human engineer review all drawings that have a human interface or impact human performance? • Does the system design reflect expected environmental conditions? • Is system software subjected to a human engineering review? • Has the Human Factors Coordinator reviewed and provided comments on program documentation? • Have HFWG team members cooperated in developing inputs to the Screening Information Request? • Have HFWG team members reviewed contractor proposals to ensure that the Government is only procuring the minimum essential data? • Have HFWG team members reviewed the results of human factors analyses and used them to improve system design, training, staffing, and operational and maintenance concepts? <p><u>Generating Human Factors Requirements in the Statement of Work Documentation</u></p> <p><u>Statement of Work (SOW)</u></p> <ul style="list-style-type: none"> • Are the human factors requirements consistent with the nature, complexity, and degree of human involvement of the program? • Do the human factors requirements cite the appropriate specifications or standards?

		<ul style="list-style-type: none"> Have all human factors-related tasks and analyses to be performed by the contractor been identified in the SOW? <p><u>Contract Data Requirements List (CDRL)</u></p> <ul style="list-style-type: none"> Has a human factor data requirement been prepared for each human factor deliverable cited in the SOW? Are the human factors-related organizations included on the distribution for the delivered product? Have the human factors data requirements been coordinated with other disciplines to eliminate redundancy of data deliverables? Is the Human Factors Coordinator responsible for participating in the approval or rejection of the delivered product? <p><u>Data Item Description (DID)</u></p> <ul style="list-style-type: none"> Has the DID been tailored to include only the information that is necessary? Are the data item requirements consistent with the nature and complexity of the program? <p><u>Specifying Human Factors in Source Selections</u></p> <p><u>Evaluation Criteria</u></p> <ul style="list-style-type: none"> Have human performance criteria or standards been identified for the system and quantified in the SIR? Does human factors (as a separate criterion or as embedded criteria in other primary factors) adequately represent the user performance, risks, complexity, consequence, and exposure? Are offerors required to develop a human factors program management plan? Are offerors required to demonstrate technical competence in human factors? <p><u>Source Selection Plan</u></p> <ul style="list-style-type: none"> Have human factors criteria been adequately and clearly identified in the source selection plan? Are human factors criteria adequately weighted for this system (considering degree of human interface with hardware and/or software)? <p><u>Source Selection Teams</u></p> <ul style="list-style-type: none"> Is there a human factors member on the source selection team or supporting panel(s)? Is the human factors member technically qualified to evaluate human factors aspects of the proposals? Where human factors criteria are embedded with other criteria, is human factors expertise represented in those other criteria evaluations? Is the source selection team adequately apprised on the evidence necessary to demonstrate vendor capability and compliance?
4. Conduct HF Verification, Validation, &	2.10 Verify work products 2.11 Measure the process	<p><u>General</u></p> <ul style="list-style-type: none"> Have human engineering testing requirements been incorporated into the system test and evaluation requirements?

Validation, & Evaluation	2.12 Review status 2.13 Take corrective action 3.3 Perform reviews with peers (Supported by iCMM HF Addendum Base Practice 24.03)	<ul style="list-style-type: none"> Have unfavorable outcomes during test and evaluation been subjected to a human engineering review? <p><u>Determining Human Factors Requirements in System Testing</u></p> <ul style="list-style-type: none"> Has a front-end analysis adequately identified the human performance issues for test planning? Have human performance critical operational issues and criteria been identified? Have human performance Measures of Effectiveness (MOEs) and Measures of Performance (MOPs) been identified? Are data requirements identified that will satisfy the MOEs and MOPs? Have the resources necessary to support the collection of human performance data been identified and made available? Has the human factors data collection effort been integrated with the system data collection effort(s)? Have options been identified for human performance data collection if the primary data collections plans are not feasible or practical? Are human performance data collected in terms of task performance time and accuracy? Are data collectors trained to identify and report potential human performance issues? Are other sources of data (such as user comments) being reviewed for human performance issues? Have human performance data been analyzed with respect to training effectiveness, task overloading, skill creep, safety, health hazard, or procedural inadequacy issues? Has feedback been provided to appropriate members of the program?
5. Other	(As appropriate)	(As appropriate)
FEEDBACK FOR ACQ. PROGRAM/ ORGANIZATION MANAGEMENT		
6. HF Process Improvement	2.5 Document the process 2.6 Plan the process 2.7 Use a repeatable process 2.9 Assess process compliance 3.1 Standardize the process 3.2 Use defined process	<ul style="list-style-type: none"> Have the conduct of program activities enabled the assessments of the human factors processes? Have weaknesses or opportunities for improvements in the human factors process been included in process improvement mechanisms? Are changes to the process improvement approach needed to facilitate human factors integration in the program?

Attachment 3

Human Factor Training Support in Acquisition Programs

I. Background: Human factors training support to teams ensures that human factors best practices are employed, so as to arrive at an acquisition solution that provides the most effective use of human capabilities and minimizes the effects of human limitations and errors on the eventual performance of the system. The human factors training required entails both generic, cross-cutting human factors technical information as well as training that varies by program and considers the differences among the systems, the acquisition strategy, the phase of development, interaction and integration with other systems, and the level and type of human involvement.

II. Approach: The implementation of this training program integrates general human factors training, specific technical human factors training, human factors process improvement considerations, as well as the concomitant assessment and mitigation planning for identified and prioritized human factors risks. Training associated with the human factors integration activities will consist of three basic elements:

A. Awareness Training: This training consists of instruction that is focused on providing basic information about human factors in general. Areas addressed may include such topics as the definition and scope of human factors; demonstrations and illustrations of human factors concepts, principles, conventions; generic and common approaches to human factors engineering in acquisition and other environments; standard practices and lessons learned; and common problems in human factors application. Included in this category are training courses such as:

- Human Factors Awareness Training
- FAA Acquisition Management Training (Human Factors Module)
- Human Factors Process Improvement, Consultation, & Awareness Training
- Lifecycle Acquisition Training Forum/Seminar

B. Tailored Program Training: This training consists of instruction that is focused on an Integrated Product Team, acquisition program office, or acquisition system. It provides information that is specifically relevant to the program or system being acquired and addresses risks or opportunities that may be peculiar to the systems or program. Areas addressed may include specific application topics or general discussions in such area as:

- Human Factors in Integrated Requirement Team Activities
- Human Factors in Investment Analysis Team Activities
- Human Factors Process Improvement, Evaluation, and Consultation
- Exit Criteria for Human Performance Issues
- Human Factors in Test and Evaluation

C. Specialized Technical Training: This training consists of instruction that is focused on technical areas of human factors that may be of specific or general interest to the ARA or FAA population. It provides information that is relevant to the application of human factors in a variety of environments. Areas addressed may include such topics as:

- Color in ATC displays
- Designing CHI and CHI prototyping techniques

- Warnings, Alerts, and Alarms
- Anthropomorphics in system design
- Survey and questionnaire design
- Human Factors Laboratory and Prototyping Demo
- Environmental considerations in system design
- Information coding
- Design for maintainability
- CHI Guidelines, Standards, and Styles
- Statistics in Human Factors
- Signal Detection Theory and False Alarm Rates

III. A sample schedule for the training plan (and implementation) is outlined in the attached table (Training Plan Implementation).

Table 3-1: Training Plan/Implementation (FY02 Plan)

Training Category	Subject Matter	Est. Resource Requirements	Resource Actuals	Planned Classes/FY02 – Location (Date, Class Size)	Status: #Conducted/FY02 Date (# Attendees)
TRAINING-A (Awareness Tng)	-HF Awareness Tng -FAMS – HF Module -HF Process Improvement, Eval, & Consult	\$120K \$.5K/session \$.5K/session		Development of Web-based course (3 initial modules) 2 or more – HQ (Nov’01, 25-30; Mar’02, 25-30) 2 or more – HQ; conducted with “tailored training” (Dec’01, 5-10)	Introduction; HF Model; Usability; Cognition; Visual Displays; FAMS: Oct’01 (26); Feb’02 (22); Mar’02 (32); May’02 (30); Jul’02 (30)
TRAINING-B (Tailored Tng)	Areas to be covered may include: HF in IRT, IAT, iCMM HF, HF in T&E)	(\$.5K/session; see HF Process Improvement, etc. above)		TBD (conducted in conjunction with HF Process Improvement, Eval, & Consult)	Portfolio Mgt: May’02 (7)
TRAINING-C (Tech Tng)	-Survey/questionnaire design - Human Factors Lab Capabilities Demo - Prototyping methods demo -Warnings, Alerts, and Alarms -Workload Measurement - Illumination - Statistics in HF - HF Cost Estimating Workshop	 \$10 \$1K		TBD TBD TBD 1-HQ (Mar’02, 20) TBD TBD 1- HQ (Feb’02, 20)	
TOTAL		\$133K		6 or more (95 or more)	6 (147 attendees)

ICIP Training Information (Sample Course Descriptions)

Course(s) Name: Human Factors Fundamentals in FAA Acquisitions

Brief course synopsis: This is a 1-hour module presented in conjunction with the FAMS Course. It provides an overview of: a) what “human factors” is, b) what acquisition “policy” requires, c) how human factors is to be addressed in acquisitions, and d) some common human factors issues and examples.

Location: Quality Inn, Arlington (Court House)

Class or course number: FAMS

Competency: Human Factors Technical Knowledge

Course(s) Name: Human Factors Awareness Training

Brief course synopsis: This 2-day course presents generic information about the human factors engineering discipline to provide a basic understanding of the scope of human factors considerations and of the importance for considering the “human factor” in the design and development of complex operating systems.

Location: TBD

Class or course number: NA

Competency: Human Factors Technical Knowledge

Course(s) Name: Use of Color in Modern Information Displays

Brief course synopsis: This 2-hour workshop on color provides information and guidance on how to use and how not to use color in ATC and AF displays. The workshop will cover: a) an introduction to "color science" (how color is produced on displays and perceived by users), b) factors that affect color appearance, c) what we know (and don't know) about how color should be used on a display, and d) guidelines for the use of color on displays.

Location: HQ FAA

Class or course number: NA

Competency: Human Factors Technical Knowledge

Course(s) Name: Survey and Questionnaire Design

Brief course synopsis: This 2-hour workshop provides a summary of the common problems, issues, and guidelines related to the design and analysis of surveys and questionnaires, especially those that may be used in acquiring information about the users of FAA systems.

Location: TBD

Class or course number: NA

Competency: Human Factors Technical Knowledge

Course(s) Name: Human Factors Process Improvement, Evaluation & Consultation

Brief course synopsis: This training consists of iterative, highly tailored exchanges between product team personnel and human factors specialists on human factors best practices, risks, and alternatives related to the specific product team’s acquisition program. It provides an opportunity to exchange information about: a) designating human factors responsibilities, b) planning human factors support activities, c) identifying human factors risks, d) conducting

mitigation activities for human factors risks, e) using results from human factors planning, analysis, development, and testing, and f) lessons learned about how human factors should be addressed in process improvement programs.

Location: TBD

Class or course number: NA

Competency: Human Factors Technical Knowledge

Course(s) Name: Human Factors Lab Capabilities and Demo

Brief course synopsis: This 1-day session provides a tour of laboratories at the William J. Hughes Technical Center with emphasis on the Human Factors Lab and discussions and demonstrations of how the lab capabilities can be used to address human factors issues.

Location: WJH Technical Center (via FAA Shuttle)

Class or course number: NA

Competency: Human Factors Technical Knowledge

Course(s) Name: Computer-Human Interface Guidelines

Brief course synopsis: This 2-hour seminar provides an update and overview of computer-human interface guidelines addressed in Chapter 8 of the FAA Human Factors Design Guide. Attendees have the opportunity to engage in a general discussion of salient issues related to employing CHI styles and standards, and are presented with information concerning the process used to update CHI guidelines; the organization and format of Chapter 8; how the guidelines should/could be used; new additions to the guidelines and why they are important; and trends in CHI and future CHI considerations.

Location: TBD

Class or course number: NA

Competency: Human Factors Technical Knowledge

Course(s) Name: Principles and Measurement of Acoustics

Brief course synopsis: This is a 7-hour module presented in conjunction with other human factors technical workshops and seminars. It provides an overview of the principles of acoustics especially related to design and testing of the auditory acquisition of information in modern workstations. This workshop/seminar provides a tutorial on the propagation of sound, physiology of hearing, determinants of detection and discrimination (including those related to masking, temporal resolution, loudness, pitch, and localization), the measures of sound, the instrumentation for noise measurement, and the use of equipment to support acoustical design, measurement, and analysis. A demonstration and hands-on familiarity with acoustic equipment will be provided.

Dates in which offered: TBD

Location: HQ FAA

Class or course number: NA

Competency: Human Factors Technical Knowledge

ATTACHMENT 4

Potential Human Factors Issues to Be Addressed

During the conduct of the human factors activities, some of the following issues may need to be assessed as well as others not listed here, but unique to specific systems:

- **Cognitive Tasks and Decision-Making:** Requirements for operator and maintainer cognitive tasks and decisions and the related performance measures
- **Workload:** Operator and maintainer task performance and workload
- **Training:** Minimized need for operator and maintainer training
- **Functional Design:** Equipment design for simplicity, consistency with the desired human-system interface functions, and compatibility with the expected operation and maintenance concepts
- **CHI:** Standardization of computer-human interface (to address common functions employ similar user dialogues, interfaces, and procedures)
- **Staffing:** Accommodation of constraints and opportunities on staffing levels and organizational structures
- **Safety and Health:** Prevention of operator and maintainer exposure to safety and health hazards
- **Special Skills and Tools:** Considerations to minimize the need for special or unique operator or maintainer skills, abilities, tools, or characteristics
- **Work Space:** Adequacy of work space for personnel and their tools and equipment, and sufficient space for the movements and actions they perform during operational and maintenance tasks under normal, adverse, and emergency conditions
- **Displays and Controls:** Design and arrangement of displays and controls (to be consistent with the operator's and maintainer's natural sequence of operational actions)
- **Information Requirements:** Availability of information needed by the operator and maintainer for a specific task when it is needed and in the appropriate sequence
- **Display Presentation:** Ability of labels, symbols, colors, terms, acronyms, abbreviations, formats, and data fields to be consistent across the display sets, and enhance operator and maintainer performance
- **Visual/Aural Alerts:** Design of visual and auditory alerts (including error messages) to invoke the necessary operator and maintainer response
- **I/O Devices:** Capability of input and output devices and methods for performing the task quickly and accurately, especially critical tasks
- **Communications:** System design considerations to enhance required user communications and teamwork
- **Procedures:** Design of operation and maintenance procedures for simplicity and consistency with the desired human-system interface functions
- **Anthropometrics:** System design accommodation of personnel (e.g., from the 5th through 95th percentile levels of the human physical characteristics) represented in the user population
- **Documentation:** Preparation of user documentation and technical manuals (including any electronic HELP functions) in a suitable format of information presentation, at the appropriate reading level, and with the required degree of technical sophistication and clarity

- **Environment:** Accommodation of environmental factors (including extremes) to which it will be subjected and their effects on human-system performance

ATTACHMENT 5

Human Factors Support for the AMS Lifecycle

(Initiated from: “Human Factors and Union Involvement in the Lifecycle Acquisition Process Implementation Plan,” dated September 21, 2000)

[As of July 15, 2002]

Section 1: Human Factors Resource Estimates

The most critical action for improving human factors in the acquisition lifecycle is to provide the necessary resources (expertise and funds) to conduct human factors activities. Table 1 provides an estimate of the human factors professionals required for this support. Resource requirements in this table are based on the best available estimates at the time of the estimates. Acquisition programs are to be reviewed periodically in order to prioritize programs to receive human factors technical support from available human factors expertise. Additional needs and redistribution of resources should be identified as new information becomes available. Staffing status is reflected on the chart at Section 2.

The resource estimates in this staffing plan reflect the requirements related to the number of positions needed to support acquisitions and related projects. Additional information about the qualifications, functions, roles and responsibilities, limits of authority, accountability, lines of communication, and reporting relationships was covered in more detail within the report “Human Factors and Union Involvement in the Lifecycle Acquisition Process Implementation Plan” and is summarized in Section 3 and 4 of this attachment.

Table 1: Human Factors Resource Estimates

Organization		Descriptive Comments	Requirement (*Min Essential)	Available
AAR	AAR-100	Chief Scientist Deputy	1 S&T (50%) 1 Senior level (50%)	Mark Rodgers #Vacancy Announcement Deputy, AAR-100
	AAR-100	AND Liaison AUA Liaison AOZ Liaison IRT/IAT Spt	*1 Senior level *1 Senior level 1 Senior level (50%) 1 Senior level	*Glen Hewitt *Chuck Overbey Paul Krois (50%) @Rebecca Gray Kip Krebs (NEXCOM-25%) @Kim Cardosi – Volpe (CHI Integration 50%) Steve Cormier (AND support)
AUA	AUA	Directorate HFC HF Sp	*1 Senior level 1 Mid level	*Dino Piccione Elizabeth Brix-Wilson
	AUA-200	IPT HFC HF Team	*1 Senior level 2 Senior level	*Dan Herschler @Paula Van Balen
	AUA-400	IPT HFC HF Team	*1 Senior level	^*Margaret Will
	AUA-600	IPT HFC HF Team	*1 Senior level	*Michele Merkle @Dave Lenorovitz
	AUA-700	IPT HFC HF Team	*1 Senior level	*#Vacancy planning @Howard Eaton – NIMS
ATB	(formerly AUA-300)	IPT HFC HF Team	*1 Senior level 2 Senior level 1 Mid level	* @Debbie Shaibe ^@Anetra Shaheed
AND	AND	Directorate HFC HF Sp	*1 Senior level 1 Mid level	*Al Poston
	AND-	IPT HFC	*1 Senior level	*@Karol Kerns (from MITRE)

	300	HF Sp	1 Mid level (50%)	^@Jay Miller (NEXCOM)
	AND-400	IPT HFC	*1 Senior level	*
	AND-500	IPT HFC HF Sp HF Sp	*1 Senior level 1 Senior level 1 Mid level	*Marc Buntin @Eric Nadler + others – ADS-B (VOLPE)
	AND-700	IPT HFC	*1 Senior level 1 Mid level (50%)	* Amy Johns - WAAAS @Dan Welch – LAAS
AOZ	AOZ	HFC HF Sp	*1 Senior level 1 Senior level 1 Mid level	* @Brenda Boone @Nikki Haas – FFP1 @Candice Graham @ Other Human Solutions Inc. support – FFP1/2
ATS	ATP	HF Sp	*1 Senior level	* ^Janett arose Greene
	ARS	HF Sp	1 Senior level 1 Senior level	Al Smith – ARX @Don Weitzman
	AAF	HF Sp	1 Senior level	
ATQ	ATQ		TBD	
AVR	AVR		TBD	&AIR-130: Colleen Donovan &AFS-400 Terry Stubblefield
	CAMI		TBD	Carol Manning – AOZ/FFP1/EnRoute
ACT	ACB?	HF Sp (Test Spt)	1 Senior level	
	ACB?	HF Sp (300) HF Sp HF Sp HF Sp	1 Senior level (300) 1 Mid level (320) 1/2 Senior level (350) 1 Mid level (350) 1 Mid level (350)	Starr Fox-McGettigan @Tony Moffa – WARP
	ACB-220		TBD	Mike McNulty Ken Allendoerfer Tanya Yuditsky Pam Della Rocco &Monicarol Nickelson (NASA) &Richard C. Lanier (NASA)
ASD	ASD-400	IAT Support	1 Senior level 1 Mid level	^@Darren Wilson
Other	Runway Safety Prog.			Larry Cole – Runway Safety Program (AAR-100)
	Total		S&T: 1 Senior Level: 33 Mid Level: 7½ Junior Level: 0 *MinEssential: 15 Total: 41½	S&T: 1 *Status of fill for minimum essential: - Federal Empl: 8 - Contract Empl: 3 - Vacancy: 4

NOTES & SYMBOLS:

[@](#) Indicates Contractor personnel

Indicates plans to acquire

[^](#) Indicates new personnel for FY

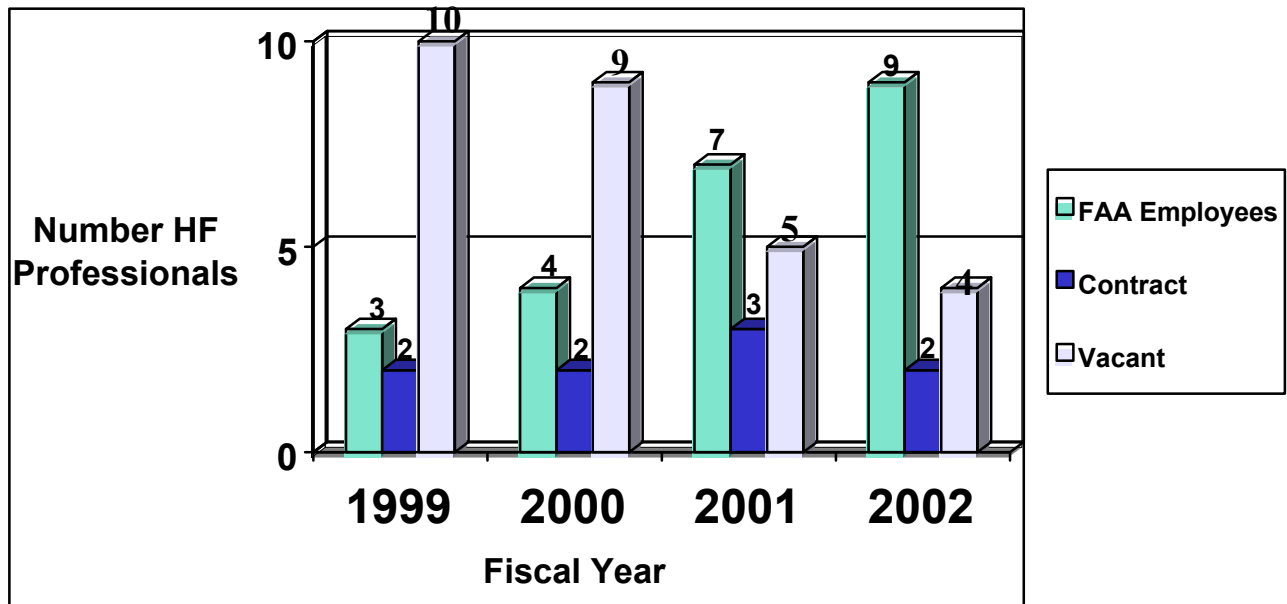
* Indicates Minimum Essential Requirement for Acquisition Support

& Indicates additional resource not counted for HFE acquisition support

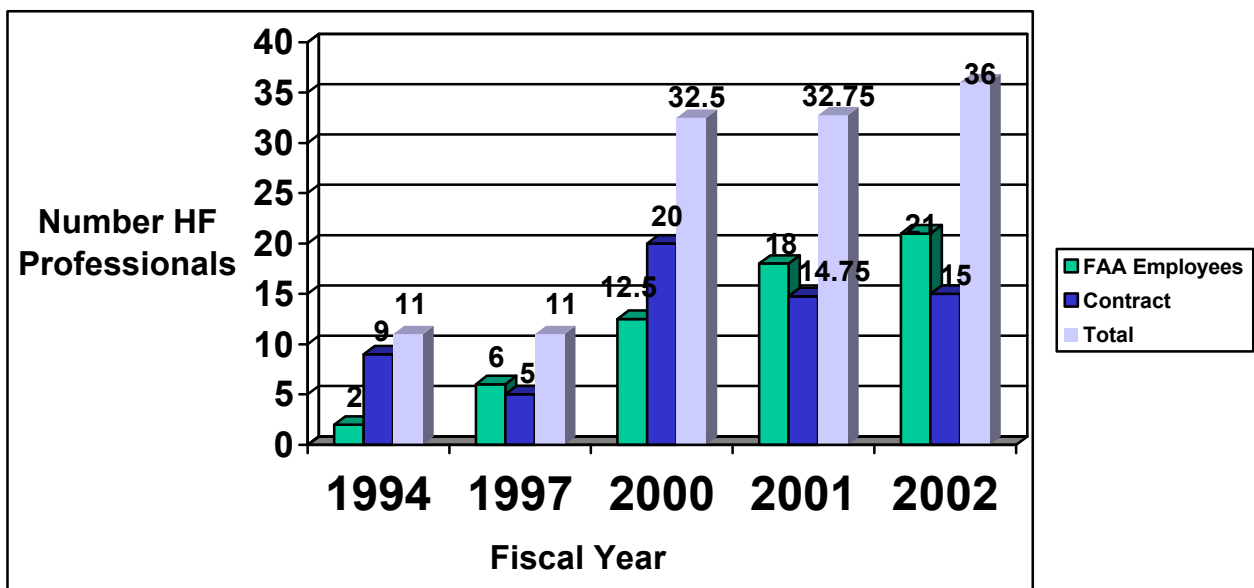
1. “HFC” refers to the role of the Human Factors Coordinator described in more detail in the FAA Human Factors Job Aid.
2. “HF Sp” refers to the role of the Human Factors Specialist supporting a program, project, or number of programs/projects.

3. The human factors personnel requirements in the table above reflect requirements for acquisitions covered by the AMS and do not include acquisitions outside of the scope of the AMS managed by organizational entities.
4. In solution implementation (SI) and in-service management (ISM) phases of AMS, human factors support at the IPT and PT level is provided from a mix of resources.
5. Human factors support from ACB-220 is largely provided through funds attached to program descriptions (PDs).

Section 2: Staffing Status



Human Factors Acquisition Support



Section 3: Qualifications

Qualifications of Human Factors Personnel: For the purposes of this staffing plan, human factors personnel qualifications will be considered as follows:

Senior-Level: Senior-level human factors personnel shall have an advanced degree in Human Factors or related field, or equivalent. Certification as a Professional Ergonomist or Human Factors Professional, although not required, provides an indication of the appropriate mix of education, experience and competence. Ten years experience performing human factors tasks directly related to the acquisition of systems that are similar in type or procedures to the FAA (e.g. Department of Defense (DOD) systems) is required. The individual must be able to work without supervision and be able to independently plan a human factors program, perform appropriate analyses during the early stages of the program, apply human factors principles during the Solution Implementation phase, and plan and conduct human factors test and evaluations.

Mid-Level: Mid-level human factors personnel shall have an advanced degree in Human Factors or related field, or equivalent. Three years experience performing human factors tasks directly related to the acquisition of systems that are similar in type or procedures to the FAA (e.g. DOD systems) is required. The individual must be able to work with minimal supervision and be able to plan a human factors program, perform appropriate analyses during the early stages of the program, apply human factors principles during the SI phase, and plan and conduct human factors test and evaluations with minor assistance.

Section 4: Functional Role of Human Factors Coordinator/Specialist

It is essential that leadership of and the responsibility for the human factors effort be clearly specified during each stage of the acquisition cycle. The human factors coordinator or specialist must be a full member of acquisition work groups and teams, functioning as a fully empowered team member within the IPDS framework. When feasible, the human factors specialist will serve as a core team member rather than an extended team member of IPTs/PTs to help ensure that human factors receive appropriate priority and resources when IPT/PT commitments are made. The specialist occupies a position in a specific FAA organization with authority to represent it, however, the specialist will also maintain a direct communication path to AAR-100 to carry out broader FAA objectives.

Mission Analysis (MA) Phase

Functional role: The sponsoring organization or its designated representative (e.g., ARS for ATS) will identify the initial need for an IRT and the requisite human factors support and will coordinate with AAR-100 (who will coordinate with AUA and AND) regarding resources, process and schedule. AAR-100 will be notified of the formation of all IRTs. During this phase, human factors specialists from AAR-100, AND or AUA will provide support, as necessary, to the IRTs. At the request of Air Traffic System Requirements Service Office of Research and Requirements Development (ARQ), AAR-100 will lead the human factors portion of the IRT activities. In these instances, AAR-100 may provide direct support to the MA activities or

recommend that ARQ obtain human factors support through the IPTs/PTs or a contractor. Human factors specialists will provide advice and counsel regarding the human performance aspects of either the capability shortfall to be overcome or the technology enhancement to be introduced. As requested, human factors input to the Mission Need Statement (MNS) will be drafted. A human factors assessment will be prepared as necessary to document the status and adequacy of the human factors effort. The human factors specialist shall develop “lessons learned” to document potential improvement in the evaluation of human performance in Mission Need Analysis. The human factors specialist will provide input to AAR-100 regarding needs for human performance research and improvements in methodologies, processes, and policies in human factors.

Number and level of positions: Resources supporting MA human factors activities for the sponsoring organization and/or its designated representatives (e.g., ARS, AAT, and AAF) are not included as a separate requirement. It is envisioned that AUA and AND support during this phase will be provided from human factors assets already identified.

Investment Analysis (IA) Phase

Functional role: During the IA phase, IRTs will request the participation of human factors specialists from ASD, AAR-100, AUA or AND as appropriate. At the request of ASD, AAR-100 will lead the human factors portion of activities for the IRT during the IA phase. Assistance will be provided in drafting the IA Plan. The human factors specialists will assist in conducting market surveys and investigations. In support of the IRT, the human factors specialist will prepare Section 6, Human Integration, of the Requirements Document (both initial and final). As defined in the FAA Systems Engineering Management Plan (SEMP) and the Systems Engineering Handbook, the human factors specialist will assist the Investment Analysis Team (IAT) in the development of the acquisition baseline documentation. Human factors input to the IA Report (IAR) will be drafted by the assigned human factors specialist. As necessary, the human factors specialist will assist in the preparation of materials for the Investment Decision JRC. A human factors assessment will be prepared as necessary to document the status and adequacy of the human factors effort. The human factors specialist shall develop “lessons learned” to document potential improvement in the evaluation of human performance in IA. The human factors specialist shall provide input to AAR-100 regarding needs for human performance research and improvements in methodologies, processes, and policies in human factors.

Number and level of positions: In addition to human factors resources within the Office of Investment Analysis and Operations Research (ASD-400) to support the IA process, other human factors support during this phase will be provided from human factors assets already existing within the participating organization (e.g., AAR-100, AND, AUA, or ATB).

Solution Implementation (SI) Phase

Functional role: During this phase, human factors specialists from AND, AUA, or other organizational elements as appropriate will provide support to IPT/PTs. The HFCs at directorate level (e.g., AND and AUA level) establish human factors leadership for IPT/PT. AAR-100 will review requests for resources from the IPT/PTs and may provide resources in response to these requests. The resources may be in the form of processes, procedures, tools, facilities, personnel, and/or expertise. The human factors specialist will prepare Section 9, Human Integration, of the

Acquisition Strategy Paper (ASP) and Section 9, Human Integration, of the Integrated Program Plan (IPP). Assistance will be provided in drafting the Screening Information Request (SIR), including the Statement of Work (SOW), Specifications, and Data Item Descriptions. Human factors specialists will interact with contractor personnel, attend technical interchange meetings and design reviews, and review contractor-prepared deliverables to ensure the human factors and human performance aspects are properly considered. Human factors specialists will also support test and evaluation activities to verify human performance requirements. A human factors assessment will be prepared, as necessary, to document the status and adequacy of the human factors effort. The specialist will also ensure that any human factors-related items in the In-Service Review Checklist are properly addressed and closed. Finally, as necessary, the human factors specialist will assist in preparation for the In-Service Decision (ISD).

Number and level of positions: Resource estimates incorporate the number and levels of positions within each organization. Each IPT/PT is responsible for acquiring the appropriate human factors resources. AAR-100 may provide assistance as requested.

In-Service Management (ISM) Phase

Functional role: The activities in this phase are similar to the SI phase for those systems that will have a major upgrade or pre-planned product improvement. Additionally, post-fielding evaluations will be conducted to determine where improvements in human performance are needed. In support of change proposals and sustainment, human factors specialists will interact with contractor personnel, attend technical interchange meetings and design reviews, provide input to and review of pre-planned product improvements for human performance assessment, and review contractor-prepared deliverables. As a part of system engineering, human factors inputs will be provided for program and acquisition reviews. Human factors specialists will also support test and evaluation activities to verify human performance requirements. A human factors assessment will be prepared as necessary to document the status and adequacy of the human factors effort. The human factors specialist shall develop “lessons learned” to document potential improvement in the evaluation of human performance in ISM. The human factors specialist shall provide input to AAR-100 regarding needs for human performance research and improvements in methodologies, processes, and policies in human factors. Beyond efforts focused on individual systems and activities conducted by ISM Teams, human factors issues and needs may be identified by a wide range of organizations during the ISM phase.

Number and level of positions: It is envisioned that support during this phase will be provided from human factors assets that were utilized during other acquisition phases. For example the human factors specialists who support system development during SI would also support human factors analyses related to pre-planned product improvements (P³I) efforts during the ISM phase. No additional resources were identified for the ISM phase.

Human Factors Support from the Technical Center and CAMI

The role of the William J. Hughes Technical Center Human Factors Branch (ACB-220) and the Civil Aeromedical Institute (CAMI) during the acquisition process will be determined on an as-needed basis by the IRTs, PTs or IPTs. Support from ACB-220 and CAMI will be in response to Program Descriptions (PDs) from the IRT or IPT to specify the tasks to be performed, schedule, and funding source. PDs requesting ACB-220 or CAMI support of the acquisition process will

be coordinated with and come through AAR-100. Any program related to human factors acquisition (e.g. human factors analyses conducted by ACT/CAMI) must be coordinated with the applicable IRT or IPT/PT and the applicable HFC.

Human Factors in Research and Development Programs

The Chief Scientist for Human Factors has the principal responsibility for developing and coordinating human factors research and development (R&D) programs with ARS, AND, AUA, and other sponsors as appropriate to ensure that the human factors R&D programs and funding are responsive to the agency's prioritized human factors research requirements. The Chief Scientist is also responsible for informing FAA management of the adverse impact to the human factors R&D programs of decisions that either directly or indirectly cause human factors Research, Engineering and Development (RE&D) funding to be reprogrammed to support F&E priorities.

It is essential that each organization with responsibility for or a role in the lifecycle acquisition process designate funds to support human factors involvement. It is also essential that within each funding category, funds be specified to support human factors involvement activities in the lifecycle acquisition process.

Goal 2 Resource Estimates (To be adjusted IAW FY02-06 Budgets)

Task ID	Human Factors Research and Acquisition Activity/Output Description	FY2002	
		PC&B \$	Contract \$
2.1.1	NAS Transition and Integration Requirements Research: Conduct human factors research studies to address today's human factors problems and issues.		2923K
2.1.2	Human Error Research: Conduct research on the amelioration of contributors to operational errors.		375K
2.2.1	Human Factors Policies, Processes, tools, and Training: <ul style="list-style-type: none"> Monitor, review, and revise FAA acquisition policy/guidance, processes, technical tools and training. 	-	30K
2.2.2	Risk Assessment and Mitigation Activities: Conduct risk assessment and Mitigation activities across systems and applications <ul style="list-style-type: none"> AUA/AND Support IRT/IAT Support ATP new hire 	-	120K*

*Indicates funds may be contract \$ or PC&B \$ (as needed and appropriate)

Goal 2 Resource Estimates (Con't)

Task ID	Human Factors Research and Acquisition Activity/Output Description	FY2003		FY2004	
		PC&B \$	Contract \$	PC&B \$	Contract \$
2.1.1	NAS Transition and Integration Requirements Research: Conduct human factors research studies to address today's human factors problems and issues.		2823K		2923K
2.1.2	Human Error Research: Conduct research on the amelioration of contributors to operational errors.		375K		375K
2.2.1	Human Factors Policies, Processes, Tools, and Training: <ul style="list-style-type: none"> Monitor, review, and revise FAA acquisition policy/guidance, processes, technical tools and training. 		20K		20K
2.2.2	Risk Assessment and Mitigation Activities: Conduct risk assessment and Mitigation activities across systems and applications. <ul style="list-style-type: none"> AND/AUA Support RT/IAT Support 		195K*		200K*

*Indicates funds may be contract \$ or PC&B \$ (as needed and appropriate)

Goal 2 Resource Estimates (Con't)

Task ID	Human Factors Research and Acquisition Activity/Output Description	FY2005		FY2006	
		PC&B \$	Contract \$	PC&B \$	Contract \$
2.1.1	NAS Transition and Integration Requirements Research: Conduct human factors research studies to address today's human factors problems and issues.		2823K		TBD
2.1.2	Human Error Research: Conduct research on the amelioration of contributors to operational errors.		375K		TBD
2.2.1	Human Factors Policies, Processes, Tools, and Training: <ul style="list-style-type: none"> Monitor, review, and revise FAA acquisition policy/guidance, processes, technical tools and training. 		25K		25K
2.2.2	Risk Assessment and Mitigation Activities: Conduct risk assessment and Mitigation activities across systems and applications. <ul style="list-style-type: none"> AND/AUA Support IRT/IAT Support 		200K*		205K*

*Indicates funds may be contract \$ or PC&B \$ (as needed and appropriate)